

BUSINESS DATA MANAGEMENT CAPSTONE PROJECT

**ANALYSIS OF REVENUE TREND AND SALES VOLUME
OF A LOCAL MULTIPURPOSE STORE**

FINAL SUBMISSION

SOHAM BHATTACHARYA

Roll No: 21F3001729

INDIAN INSTITUTE OF TECHNOLOGY, MADRAS

Acknowledgement

I have invested the best of my efforts in this project to make it a successful one. However, it would not have been possible without the kind support and help of the professors of my college, Indian Institute of Technology, Madras. I would like to extend my sincere thanks to all of them.

I would like to express my special gratitude and thanks to my college IIT Madras for providing me this wonderful opportunity to develop this Capstone Project.

I am highly indebted to Prof. G. Venkatesh, Dr. Milind Gandhe, Prof. Rahul R. Marathe and other instructors of this course for their guidance and constant supervision as well as for providing necessary information regarding the project & also for their support in completing the project. I would like to express my gratitude towards my parents & member of Nandy Gift House for their kind co-operation and belief which helped me in the completion of this project.

I would like to acknowledge that this project was completed entirely by me and not by someone else.

Soham Bhattacharya.

12f3001729

Contents

1. Executive Summary	4
2. Business Problem	4
3. Detailed Explanation of Process/Method	
a. Details about the methods used with justification	4
b. Details about the intended data collection	5
c. Details about the analysis tools with justification	5
4. Document Link	5
5. Document Format visuals	6
6. Results and Findings	
a. Sales Pareto	8
b. Revenue Pareto	9
c. Daily Sales	10
d. Daily Revenue	11
e. Revenue Generated per Business Unit	11
f. Sales Trend	
i. Beverages	12
ii. Biscuits	13
iii. Snacks	13
iv. Cosmetics	14
v. Pen	15
vi. Pencil	15
vii. Erasers	16
viii. Files	17
ix. Notebooks	17

1. Executive Summary:

The Business Data Management Capstone Project is a project submitted as a part of the curriculum of BS in Data Science and Application, by IIT Madras. The project aims to develop an optimal solution to a business problem using all sorts of data science techniques. The data used in this project has been collected from a local multipurpose store named 'Nandi Gift House'.

The received data was cleansed and formatted in order to make it comprehensive enough for the purpose of analysis. The main objective behind the analysis is to find scopes of improvement in the revenue generation by extracting meaningful insights from it. This file details the data collection methods and the analysis tools used to solve the business problem

2. Business Problem

- a. Perform a general analysis on the sales data and the revenue data to find scopes of improvement in the figures
- b. Analyse the revenue trend and suggest when and where the company should make investments in order to boost the revenue
- c. Investigate to find scopes of introduction of new products based on the performance of the product category

3. Detailed Explanation of Process/Method

- a. Details about the methods used with Justification
 - i. The store recently started storing the data in spreadsheets. Raw data in form of spreadsheet was collected.
 - ii. The data was cleansed and formatted; organized into different categories.

- iii. Various factors like sales volume and revenue figures, categorical inter-relations will be analysed
- iv. The trends in these parameters will be investigated using graphs and plots available in Excel

b. Details about the intended data collection with Justification

- i. Data in form of spreadsheet was collected for a period of 4 months.
- ii. Sales data and revenue data was separated and data was formatted for better understanding.

c. Details of the analysis tools with justification

- i. MS Excel and Google Sheets are the primary tools used for analysis
- ii. Tools like graphs, pivot tables, trend curves are used for studying the given data
- iii. Inferences are made based on the pictorial representations and tables in order to achieve the objectives

Link to the Google Drive Folder containing all the necessary documents

<https://drive.google.com/drive/folders/1zECaBYFxbJ7ACR9XY42qFrGCon7MM0o?usp=sharing>

	A	B	C	D	E	F	G	H	I	J	K	L	
1	Date (mm-dd-yyyy)	Drinking Water Bottles	Soda	Bourbon	Marie Biscuits	Haldiram Bhujia	Bapuji Cake	Soft Drink (Glass Bottle)	Soft Drink (1L plastic bottle)	Soft Drink (500 ml plastic bottle)	Chips	Biskfarm Cookies	Box
2	Category	Beverages	Beverages	Biscuits	Biscuits	Snacks	Snacks	Beverages	Beverages	Beverages	Snacks	Biscuits	Cc
3	08-01-2022	18	18	14	24	53	42	47	25	51	78	10	
4	08-02-2022	21	22	15	20	68	48	53	18	29	75	23	
5	08-03-2022	20	14	7	11	46	49	48	13	31	98	10	
6	08-04-2022	29	23	7	19	56	46	41	16	31	95	19	
7	08-05-2022	29	20	13	16	56	60	24	17	35	64	10	
8	08-06-2022	33	21	9	17	91	43	20	27	59	64	16	
9	08-07-2022	15	10	11	11	86	56	57	26	70	91	9	
10	08-08-2022	32	11	13	22	96	60	56	25	45	98	10	
11	08-09-2022	38	11	7	24	80	34	49	12	70	91	14	
12	08-10-2022	23	14	11	22	54	32	46	13	34	94	16	

The above is the image of the spreadsheet collected from the company

Data collected had two sheets in a workbook: Rate chart and the other had 29 columns, Date and the remaining had all the different products available at

the store; this primary raw data was cleansed into 9 categories and proper documentation was made; SKU dictionary was created for easier reference of data. Each product column contained the sale volume of each day. Data pre-processing, cleaning and EDA on this cleaned data was performed using Microsoft Excel.

Spreadsheets used for the purpose of analysis are ‘Nandy Gift House - 26 December 2022’ (raw data spreadsheet), ‘SKU Dictionary’, ‘Dataset’, ‘Product Specific Data’ and ‘Sales Trend’

- The raw data received was cleansed and formatted into a new spreadsheet named ‘Dataset’ containing 9 columns namely date, day, month, category, SKU, Item Name, Item Price, Sales Quantity and Revenue.

	A	B	C	D	E	F	G	H	I
1	Date	Day	Month	Category	SKU	Item Name	Item Price	Sales Quantity	Revenue
2	1-Aug-22	Mon	August-22	Beverages	BE01	Drinking Water Bottles	₹ 20.00	18	₹ 360.00
3	1-Aug-22	Mon	August-22	Beverages	BE02	Drinking Soda	₹ 15.00	18	₹ 270.00
4	1-Aug-22	Mon	August-22	Biscuits	BI01	Bourbon	₹ 25.00	14	₹ 350.00
5	1-Aug-22	Mon	August-22	Biscuits	BI02	Marie Biscuits	₹ 38.00	24	₹ 912.00
6	1-Aug-22	Mon	August-22	Snacks	SN01	Haldiram Bhujia	₹ 30.00	53	₹ 1,590.00
7	1-Aug-22	Mon	August-22	Snacks	SN02	Bapuji Cake	₹ 7.00	42	₹ 294.00
8	1-Aug-22	Mon	August-22	Beverages	BE03	Soft Drink (Glass Bottle)	₹ 60.00	47	₹ 2,820.00
9	1-Aug-22	Mon	August-22	Beverages	BE04	Soft Drink (1L plastic bottle)	₹ 50.00	25	₹ 1,250.00

Image of ‘Dataset’

- ‘SKU Dictionary’ stores all Item Names with its corresponding SKU Code along with its category

	A	B
1	Item Name	SKU
2	Drinking Water Bottles	BE01
3	Drinking Soda	BE02
4	Soft Drink (Glass Bottle)	BE03
5	Soft Drink (1L plastic bottle)	BE04
6	Soft Drink (500 ml plastic bottle)	BE05
7	Bourbon	BI01
8	Marie Biscuits	BI02

- ‘Product Specific Data’ is the spreadsheet that contains the pareto chart for both sales and revenue. It contains two worksheets namely ‘Sales’ and ‘Revenue’.

- ‘Sales’

	A	B	C	D	E
1	Item Name	SKU	Sales	Cumulative Sales Percentage	Percentage Contri
2	Chips	SN03	9502	8.96%	8.96%
3	Haldiram Bhujia	SN01	8048	16.54%	7.59%
4	Graphite Pencils (Set of 6)	WMPE02	6961	23.11%	6.56%
5	Lead Pencils (Set of 3)	WMPE01	6629	29.35%	6.25%
6	Bapuji Cake	SN02	5191	34.25%	4.89%
7	Soft Drink (500 ml plastic bottl	BE05	5056	39.01%	4.77%
8	Black Ink Pen	WMP01	4939	43.67%	4.66%
9	Soft Drink (Glass Bottle)	BE03	4513	47.92%	4.25%
10	Lined Short Notebook	WMNT03	4131	51.82%	3.89%
11	Blue Ink Pen	WMP02	3836	55.43%	3.62%
12	Blank Long Notebook	WMNT01	3587	58.87%	3.38%

This worksheet contains the sales for each product item available at the store. According to this data, the table was sorted and then the Sales Pareto chart was prepared.

- ‘Revenue’

	A	B	C	D	E
1	Item Name	SKU	Revenue	Cumulative Revenue Percentage	Percentage Contribution
2	Deodorants	COSM02	₹ 318,450.00	10.09%	10.09%
3	Soft Drink (Glass Bottle)	BE03	₹ 270,780.00	18.67%	8.58%
4	Haldiram Bhujia	SN01	₹ 241,440.00	26.31%	7.65%
5	Lead Pencils (Set of 3)	WMPE01	₹ 198,870.00	32.61%	6.30%
6	Soft Drink (500 ml plastic bottl	BE05	₹ 176,960.00	38.22%	5.61%
7	Body Lotion	COSM01	₹ 169,650.00	43.59%	5.37%
8	Graphite Pencils (Set of 6)	WMPE02	₹ 167,064.00	48.89%	5.29%
9	Blank Long Notebook	WMNT01	₹ 143,480.00	53.43%	4.55%
10	Face Cream	COSM03	₹ 127,600.00	57.47%	4.04%
11	Soft Drink (1L plastic Bottle)	BE04	₹ 125,350.00	61.44%	3.97%
12	Color Pencils Set	WMPE03	₹ 116,840.00	65.14%	3.70%
13	Lined Short Notebook	WMNT03	₹ 103,275.00	68.17%	3.27%

This worksheet contains the revenue for each product item available at the store. According to this data, the table was sorted and then the Revenue Pareto chart was prepared.

- ‘Rate Chart’ stores the price of each product item

	A	B	C
1	Item Description	Category	Price
2	Drinking Water Bottles	Beverages	₹ 20.00
3	Soda	Beverages	₹ 15.00
4	Bourbon	Biscuits	₹ 25.00
5	Marie Biscuits	Biscuits	₹ 38.00
6	Haldiram Bhujia	Snacks	₹ 30.00
7	Ranui Cake	Snacks	₹ 7.00

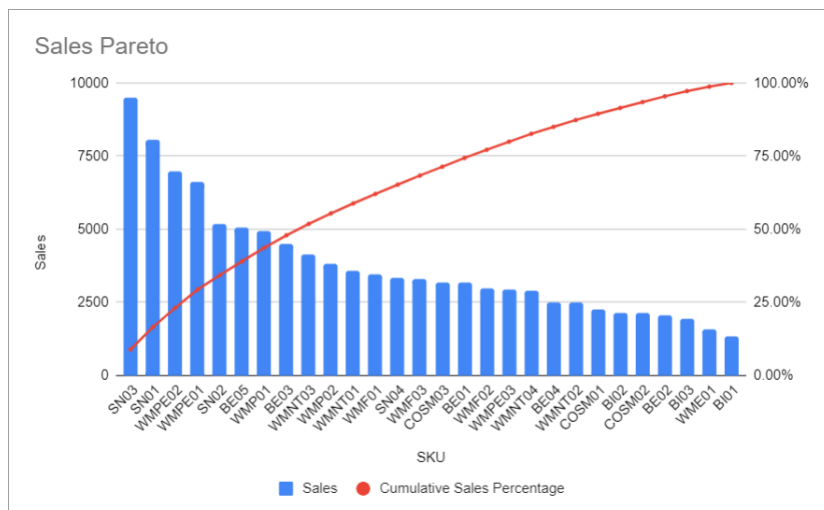
- ‘Sales Trend’ contains 9 worksheets for 9 categories of products. Each worksheet contains one column for the dates and remaining there exist one column for each product to store its sales on the corresponding date.

	A	B	C	D	E	F
1	Date	BE01	BE02	BE03	BE04	BE05
2	1-Aug-22	18	18	47	25	51
3	2-Aug-22	21	22	53	18	29
4	3-Aug-22	20	14	48	13	31
5	4-Aug-22	29	23	41	16	31
6	5-Aug-22	29	20	24	17	35
7	6-Aug-22	33	21	20	27	59
8	7-Aug-22	15	10	57	26	70
9	8-Aug-22	32	11	56	25	45
10	9-Aug-22	38	11	40	12	70

Image of the worksheet ‘Beverages’ from ‘Sales Trend’ spreadsheet

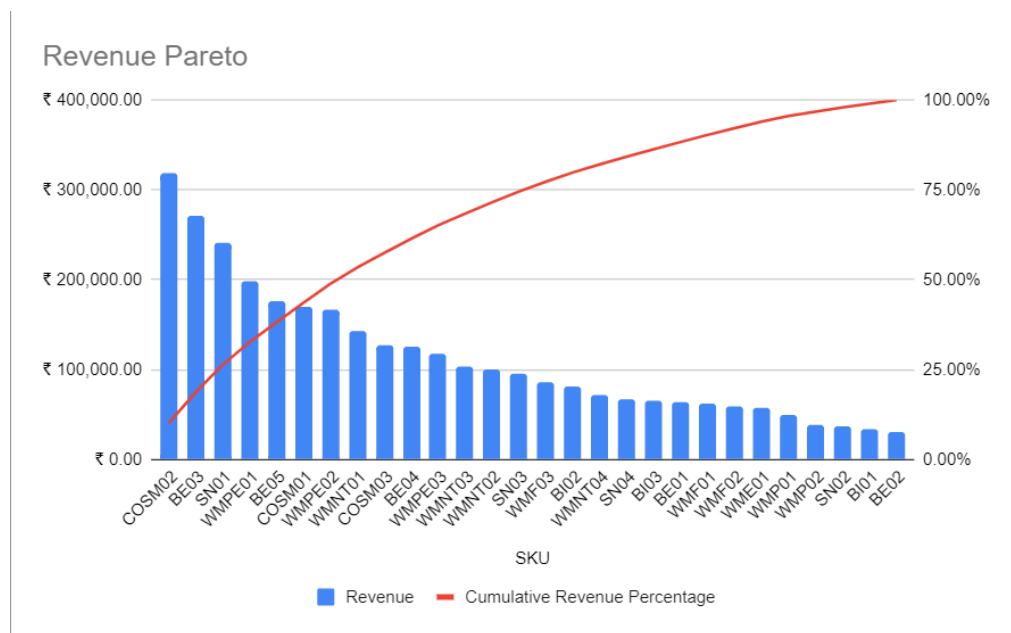
4. Results and Findings

a. Sales Pareto chart



The above diagram does not obey the Pareto principle
 SN03 (9502), SN01 (8048), WMPE02 (6961), WMPE01 (6629)
 are the highest selling products within this time interval of 4 months.

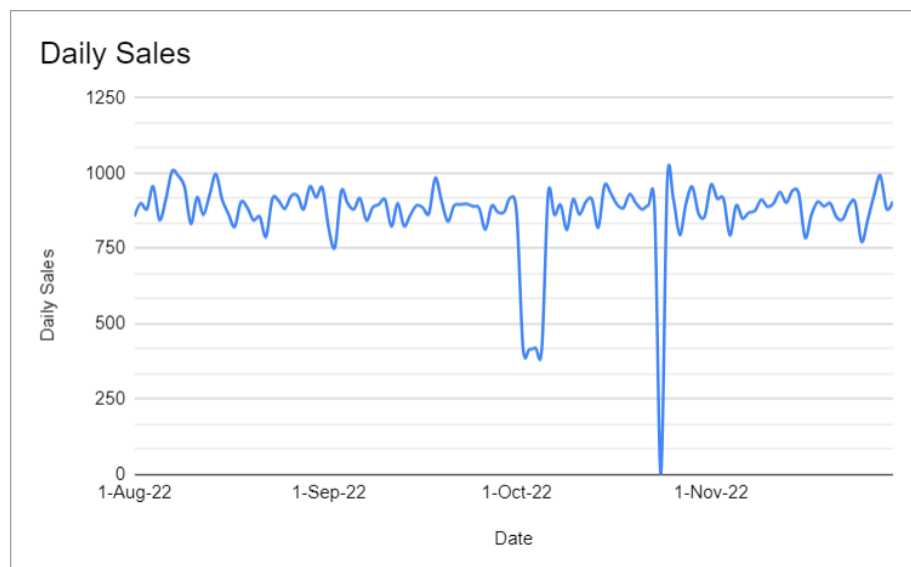
b. Revenue Pareto



The above diagram does not obey the Pareto principle.

COSM02, BE03, SN01 are the leading revenue generators within
 this time interval of 4 months.

c. Daily Sales

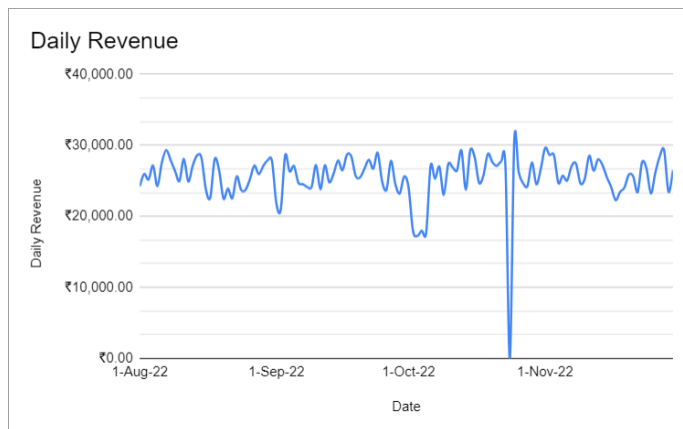


The above line diagram shows the trend of daily sales.

We find two exceptions:

- i. We see a significant drop in the sales figure during the period 1st Oct 2022 to 5th Oct 2022. This is possibly due to the festival Durga Puja, when the store remains open only for the first half of the day.
- ii. We see a reduction in the sale figure on 24th October 2022. Sales is zero on 24th October 2022 because the store was closed for the occasion of KaliPuja.

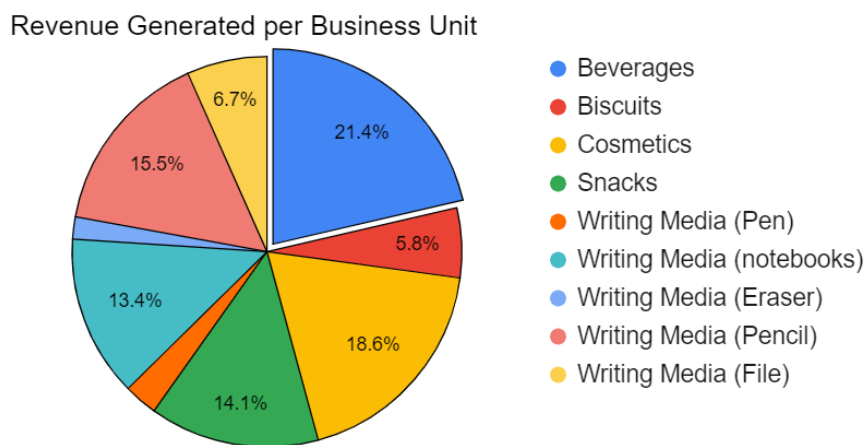
d. Daily Revenue



The above diagram shows the trend of daily revenue.

Similar to the graph of daily sales, we find that there is reduction in the revenue at the same points of time. The reasons behind such a reduction remain the same for revenue as well.

e. Revenue generated per business unit

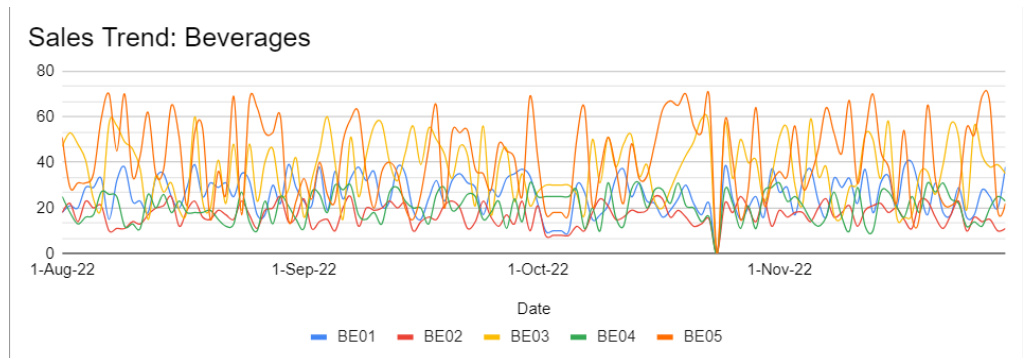


The most revenue (21.4%) is brought by the sales of beverages, followed by Cosmetics (18.6%) and Pencils (15.5%). The sales of Eraser (writing media) contributes the least in the revenue generation.

The performance of writing media (erasers) must be monitored in the upcoming few months and accordingly the product should be continued or restricted to be delivered only on order.

f. Sales Trend

i. Beverages

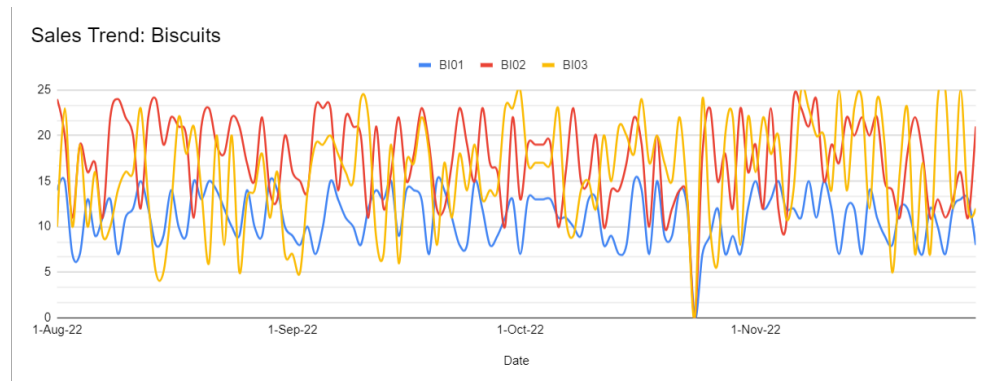


BE05 (5058) is the highest selling beverages at this store; followed by BE03 (4513). It is seen that BE02 (2065) remains at an all-time low at sales.

It is suggested that obliteration of the product might create an inventory space for the introduction of a new product variant. Since, BE05 is sold the most, introducing a variant of product BE05 in place of BE02 would be advisable.

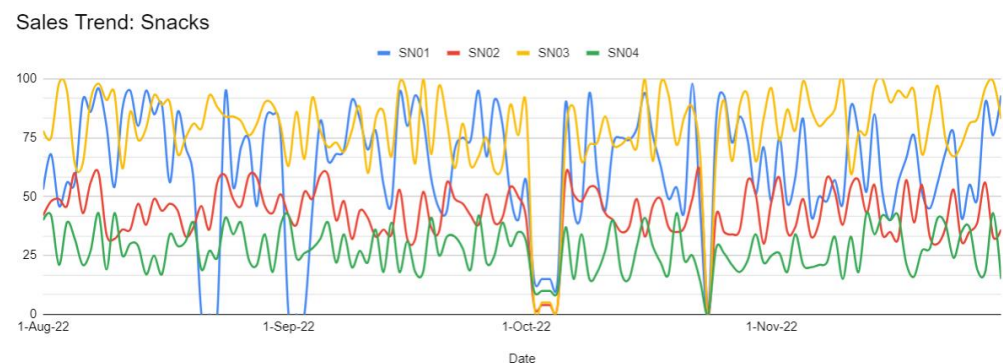
Since Beverages serve to be the highest contributor in revenue generation, the sales of beverages should be prioritized over other products.

ii. Biscuits



Here, BI02 (2123) is the highest selling product. BI03 has an oscillating nature of sales in this time period. In such a case, it is not possible to arrive at a conclusion regarding the future of this product; the product is seemingly a new one in the market and hence this kind of behaviour.

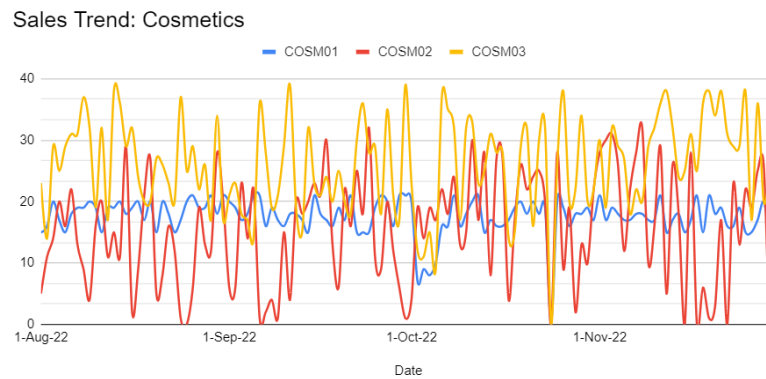
iii. Snacks



Snacks have a distinctive trend pattern for each of its product. SN03 (9502) serves to be the highest selling snack. SN01 almost matches the sales of SN03 at the peaks but has significant huge drops in sales figure periodically. The significant reduction in the sales figure of SN01 during Sept 1 2022 to Sept 3 2022 and Aug 21 2022 to Aug 23 2022 was

due to some transportation issue of shipping this particular product.

iv. Cosmetics



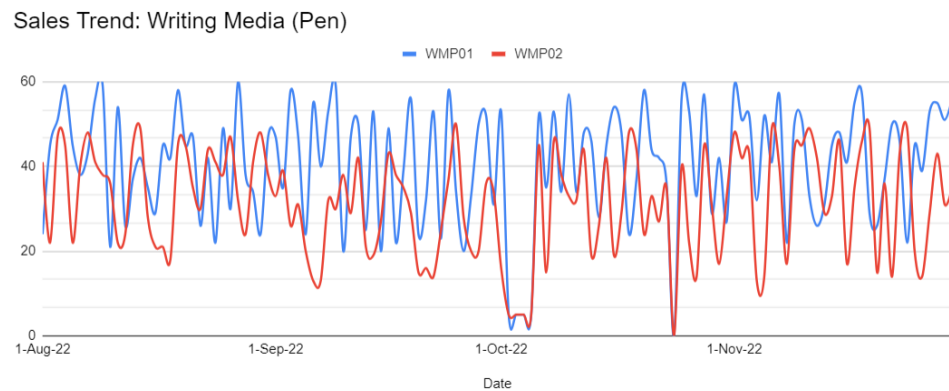
COSM03 (3157) serve to be the highest selling cosmetic at this store; while COSM02 (1892) shows typical low sale patterns.

Earlier, we have seen that Cosmetics is the second highest in revenue generation. It is thus suggested that the company should invest more on cosmetic products, which will in turn increase the revenue.

Hence, it is advised to replace COSM02 with a variant of COSM01/COSM03 or introduce a new cosmetic product in place of COSM02, which has potential of high sales in the existing market.

COSM01 shows a stable behaviour in the sales pattern; obliterating COSM02 will enable more inventory space; half of which could be used to store more COSM01 products, and the remaining half could be used for storing a new similar/variant of COSM03.

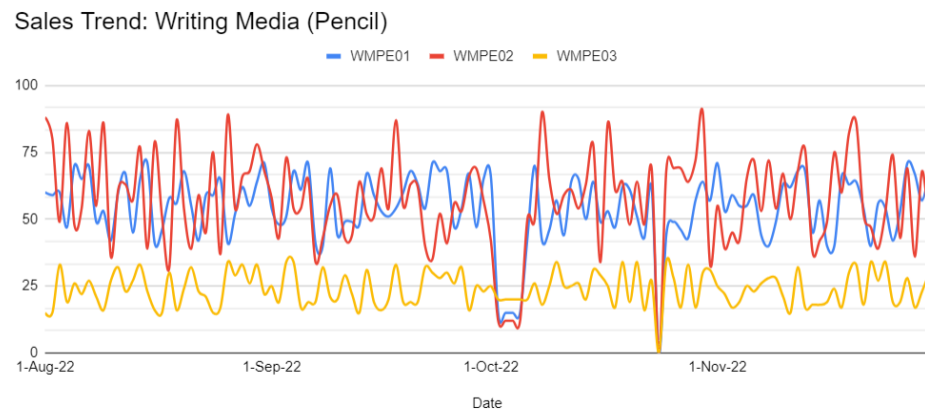
v. Pen(WritingMedia)



WMP01 (4939) sells more than WMP02 (3836).

Pens contribute significantly less in the net revenue. Introduction of variety of pens is suggestible because there is no significant drop in the sales pattern

vi. Pencil (writing media)

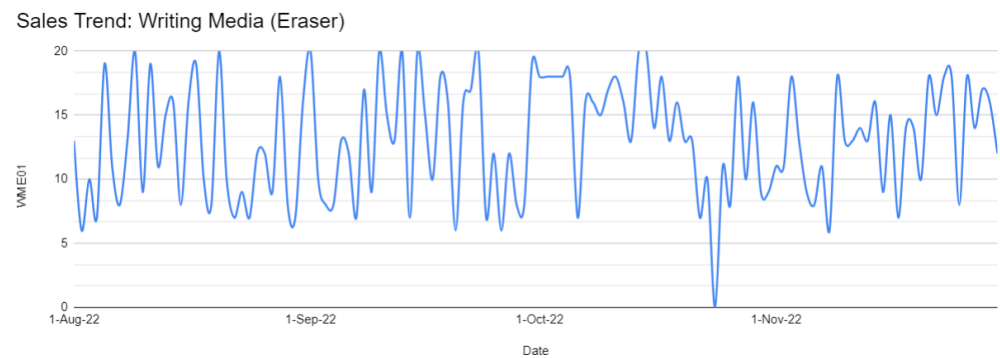


WMPE02 (6961) is the highest selling pencil at this store. Nevertheless, WMPE01 (6629) proves to be a good competition to WMPE02.

It is noticeable that WMPE03 (2921) is the least selling pencil and is stable. Hence, it is suggested to be replaced with another similar product or a variant of WMPE02.

Since, pencils serve to be the third highest in revenue generation, it is guaranteed that replacement of product in this manner will increase the revenue.

vii. Erasers

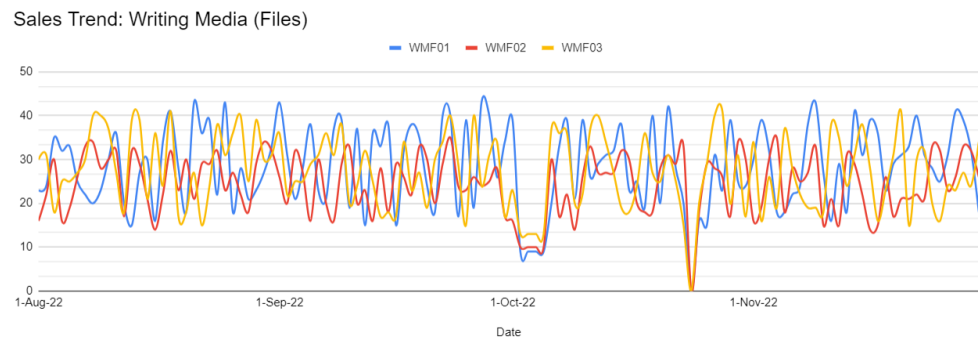


There exists only one kind of eraser in the store. Total sales for this product in this time period has been 1592.

We have seen that erasers prove to be contributing the least in revenue generation; which should not be the case since pencils are the third highest in revenue generation and pencils and erasers are complements.

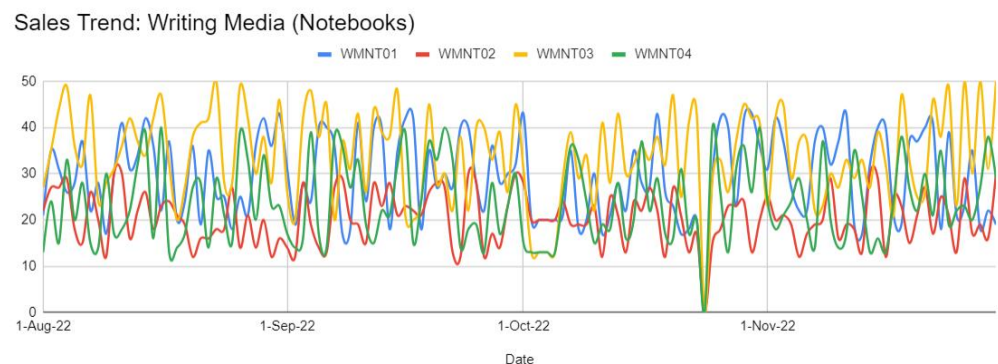
There must be some discrepancy in the quality of the product which prevents the customers from purchasing the product. It is highly advisable to replace WME01 with a new product.

viii. Files (Writing Media)



As per the sale pattern in the graph, WMF01 (3459) is the highest selling product in this category. Overall, there is nearly no difference among the sale pattern of the products. Increasing the inventory space for this category will increase the revenue generation.

ix. Notebooks



As per the curve above, WMNT03 (4133) is the highest selling notebook. Overall, there is a seemingly fluctuating sale pattern of the different products.

THE END